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March 30, 2000

## BOX PCT

Honorable Commissioner of  
Patents and Trademarks  
Washington, D.C. 20231

PCT/EP99/05951  
- filed August 13, 1999

Re: Application of Thomas MÜLLER  
"METHOD FOR RECEIVING RADIO SIGNALS OF  
DIFFERENT STANDARDS"  
Our Ref.: 3926.004

Dear Sir:

The following documents and fees are submitted herewith in connection with the above application for the purpose of entering the National stage under 35 U.S.C. §371 and in accordance with Chapter I of the Patent Cooperation Treaty:

- ☒ this express request to immediately begin national examination procedures (35 U.S.C. 371(f)).
- ☒ an executed Declaration and Power of Attorney.
- ☒ a German Language International Application with European Search Report
- ☒ an English (translation of the) International Application.
- ☐ an English (translation of) Article 19 claim amendments.
- ☐ English translation of Article 34 amendments (annexes to the IPER) and German language IPER.
- ☐ an executed Assignment and PTO 1595 form.
- ☐ executed Small Entity Declaration - Independent Inventor.
- ☐ executed Small Entity Declaration - Small Business Concern.
- ☒ Preliminary Amendment.

It is assumed that copies of the International Application, the International Search Report, the International Preliminary Examination Report, and any Articles 19 and 34 amendments as required by §371(c)

Attorney Docket: 3926.004

The Government filing fee is calculated as follows:

TOTAL FILING FEE .....	\$840.00
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By Stephan A. Pendorf  
Registration No. 32,665

[illegible]

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Thomas MÜLLER

Appln. No.:

Filed: March 30, 2000

For: METHOD FOR RECEIVING RADIO SIGNALS OF  
DIFFERENT STANDARDS

Attorney Docket No.: 3926.004

PRELIMINARY AMENDMENT

Box: PCT

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Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application,  
please amend the application as follows:

IN THE SPECIFICATION:

Page 1, line 1, delete "Description";

Page 1, line 6, insert:

--BACKGROUND OF THE INVENTION

Field of the Invention--;

Page 1, line 8-9, delete according to the pre-  
characterizing portion of Patent Claim 1 ;

Page 1, line 10, insert:

--Description of the Related Art--;

Page 1, before line 25, insert:

--SUMMARY OF THE INVENTION--;

Page 2, delete the first paragraph (lines 1-3) in its entirety and insert:

--The invention provides a process for simultaneously receiving different radio standards, comprising carrying out a superimposing of multiple various modulation types of the radio standard and, carrying out a separation of the same by a subsequent digital signal processing.--

Page 2, line 18, insert:

--BRIEF DESCRIPTION OF THE DRAWINGS--.

Page 3, line 3, insert:

--DETAILED DESCRIPTION OF THE INVENTION--.

IN THE CLAIMS:

Page 5, line 1, please delete "PATENT CLAIMS" and insert therefore --What is Claimed is:--

Please amend the claims as follows:

1. (Amended) A process [Process] for simultaneously receiving different radio standards, [thereby characterized,] comprising:
  - carrying out [that] a superimposing of multiple various modulation types of the radio standard [are carried out] and,
  - carrying out [that] a separation of the same by a subsequent digital signal processing [is carried out].

Claim 2, line 1, delete "thereby characterized, that" and insert therefore --wherein--;

U.S. Application No.: NEW  
PRELIMINARY AMENDMENT

ATTORNEY DOCKET: 3926.004

Claim 3, line 1, delete "thereby characterized, that" and insert therefore --wherein--;

4. (Amended) Process according to Claim 3, [thereby characterized, that] wherein as the sum of the output of two narrow band oscillators is employed local oscillator[s] for the first mixing step [the sum of the output of two narrow band oscillators is employed].

Claim 5, line 1, delete "thereby characterized, that" and insert therefore --wherein--;

Claim 6, line 1, delete "thereby characterized, that" and insert therefore --wherein--;

Claim 7, line 1, delete "thereby characterized, that" and insert therefore --wherein--; and

Claim 8, line 1, delete "one of the preceding claims, thereby characterized, that" and insert therefore --claim 1, wherein--.

#### REMARKS

The specification claims have been amended to conform the original translated specification and claims to U.S. requirements, i.e., appropriate section headers are added, reference in the specification to the claims have been amended in order to eliminate multiple dependent claims and claims improperly depending from multiple dependent claims, and to otherwise conform the claims to U.S. practice. Care has been taken to ensure that no new matter is added to the text.

3/PRD

09/509626

430 Rec'd PCT/PTO 30 MAR 2000

Description

5 Method for Receiving Radio Signals of Different Standards

The invention concerns a method for receiving different types of radio standards according to the pre-characterizing portion of Patent Claim 1.

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Signal transmission in the field of mobile communications (GSM, DCS 1800) and satellite navigation (GPS) involves different radio standards (modulation types, signal band widths), which must be processed with the aid of receivers. Importance is placed in particular upon a combined processing of the signals. Until now, solutions have been limited to a separate processing with respective separate receiver structures, which must be combined with the aid of a computer. In this respect, it would be desirable to have a receiver, which can accommodate the various radio standards as so called multi-mode receiver.

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The hitherto employed classical architecture in heterodyne receivers or digital receivers have dynamic compensation problems in the case of high loads or demands.

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The invention is based on the task of providing a process, in which the processing efficiency of the radio signals is increased.

- 1 -

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The invention is set forth in the characterizing section of Patent Claim 1. The subsequent claims recite advantageous embodiments and further developments of the invention.

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The invention includes a process, in which the addition of a CDMA encoded signal and a hitherto conventional modulated signal, preferably at intermediate frequencies, leads to a simplification of the demands on the analog-to-digital converter and the intermediate frequency editing since before decorrelation the CDMA signal can be lower than the background noise and is raised from the background noise ( $N_0$ ) only by subsequent decorrelation.

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A particular advantage of the invention is comprised therein that, in comparison to hitherto conventional systems, less hardware components are required. Thereby, A/D converters to mixers and filters can be saved.

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In the following, the invention will be described in greater detail on the basis of illustrative embodiments shown in schematic manner in the figures. There is shown:

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Fig. 1 Levels of different signals in the example of GPS and DAB

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Fig. 2 Addition subsequent to the first mixing step

Fig. 3 Addition prior to the first mixing step

Fig. 4 Simplification by special HF-filter structures

Fig. 5 Transmission characteristics of the special HF-filters

In a first illustrative embodiment according to Fig. 1, the level of the different signals, for example GPS and DAB, is shown. The addition of a CDMA-coded signal and a conventional modulated signal are carried out in intermediate frequencies. Thereby, the CDMA-signal lies below the background noise before decorrelation and is only lifted out of the noise  $N_0$  by a later decorrelation.

In a second illustrative embodiment according to Fig. 2, high frequency signals of two separate mixers L01 and L02 are mixed down to the same intermediate frequency. The amplification factors G1 and G2 of the two branches are so selected, that the CDMA-signal for example a GPS-signal does not disturb the other signal for example a OFDM-coded DAB-signal. Not until the digital signal processing following the analog-digital-conversion A/D are both signal parts again separated and the GPS-signal lifted out of the noise through decorrelation. Thereby, the digitalization can occur directly in the base band or directly in the intermediate frequencies.

In a third illustrative embodiment according to Fig. 3, there is shown the alternative possibility of adding both signals already prior to the mixer and to subsequently mix down to the intermediate frequency with a mixer. As local oscillator, two



narrow band oscillators are employed in accordance with the sum of the output. In this embodiment, however, the requirements placed upon the input filter are somewhat raised.

In a fourth embodiment according to Fig. 5, there is also the possibility of employing a special input filter, which undertakes the level adaptation or interfacing  $a_1$  and  $a_2$  and the band selection  $f_1$  and  $f_2$  in integrated manner. Thereby, the complexity prior to the mixer is again reduced in accordance with Fig. 4. The attenuation co-efficient in the passbands  $a_1$  and  $a_2$  are so dimensioned that the CDMA-signal becomes lower than the noise level of the OFDM-signal.

## Patent Claims

1. Process for simultaneously receiving different radio standards, thereby characterized,
  - that a superimposing of multiple various modulation types of the radio standard are carried out and,
  - that a separation of the same by a subsequent digital signal processing is carried out.
2. Process according to Claim 1, thereby characterized, that the superimposing is carried out in two frequency ranges.
3. Process according to Claim 1, thereby characterized, that a superimposing of high frequency signals is carried out prior to the first mixing step.
4. Process according to Claim 3, thereby characterized, that as local oscillators for the first mixing step the sum of the output of two narrow band oscillators is employed.
5. Process according to Claim 3, thereby characterized, that for each modulation type one filter and amplifier is employed.

6. Process according to Claim 3, thereby characterized, that for all modulation types a special HF-filter with level accommodation and band selection is employed.
7. Process according to Claim 1, thereby characterized, that a superimposing of a CDMA-encoded and a OFDM-encoded signal is carried out.
8. Process according to one of the preceding claims, thereby characterized, that prior to decorrelation or demodulation, an A/D conversion is carried out.

# ABSTRACT

The invention relates to a method according to which the addition of a CDMA-coded signal and a conventionally modulated signal, preferably at intermediate frequencies, simplifies the demands with regard to the analog-to-digital converter and intermediate frequency editing since before decorrelation the CDMA signal can be lower than the background noise and is raised from said background noise ( $N_0$ ) only by subsequent decorrelation.

## DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name: that I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural names are listed below) of the subject matter claimed and for which a patent is sought in the application entitled:

### PROCESS FOR RECEIVING DIFFERENT TYPES OF RADIO STANDARDS

which application is:  
the attached application  
(for original application)

Based on Application No. \_\_\_\_\_  
filed \_\_\_\_\_, and amended on \_\_\_\_\_  
(for declaration not accompanying application)

that I have reviewed and understand the contents of the specification of the above-identified application, including the claims, as amended by any amendment referred to above; that I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56, that I hereby claim foreign priority benefits under Title 35, United States Code §119, §172 or §365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified on said list any foreign application for patent or inventor's certificate on this invention having a filing date before that of the application on which priority is claimed:

Application No.	Country	Filing Date	Priority Claimed (yes or no)
198 38 244.8	Germany	August 22, 1998	yes

I hereby claim the benefit of Title 35, United States Code §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in a listed prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge my duty to disclose any material information under 37 C.F.R. §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Application No.	Filing Date	Status (patented, pending, abandoned)

I hereby appoint Stephan A. Pendorf, Reg. No. 32,665 and Yaté K. Cutliff, Reg. No. 40,577, my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and request that all correspondence about the application be addressed to Stephan A. Pendorf at Pendorf & Cutliff, P.O. Box 20445, Tampa, FL 33622-0445.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date 8.3.2000

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Residence same as P.O.

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Citizenship Germany

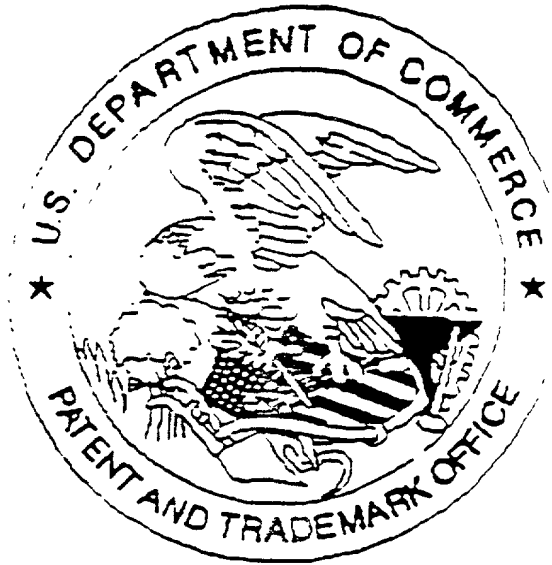
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